

CLAIMS

1. A method for manufacturing a single crystal semiconductor doped with an impurity by immersing a seed crystal in a melt within a crucible and pulling the seed crystal while rotating the same, characterized in that:

in the course of pulling the single crystal semiconductor, a rotating velocity of the single crystal semiconductor being pulled is adjusted to a predetermined value or higher and a magnetic field having a strength in a predetermined range is applied to the melt.

2. A method for manufacturing a single crystal semiconductor doped with an impurity by immersing a seed crystal in a melt within a crucible and pulling the seed crystal while rotating the same, characterized in that:

in the course of pulling the single crystal semiconductor, a peripheral velocity at the outer periphery of the single crystal semiconductor being pulled is adjusted to 0.126 m/sec or higher, and a magnetic field is applied to the melt to satisfy the condition:

$$35.5 \leq M/V^{1/3} \leq 61.3$$

where M denotes a magnetic field strength at the bottom of the crucible, and V denotes a volume of the melt within the crucible.

3. A method for manufacturing a single crystal semiconductor doped with an impurity by immersing a seed crystal in a melt within a crucible and pulling the seed crystal while rotating the same, characterized in that:

in the course of pulling the single crystal semiconductor, a peripheral velocity at the outer periphery of the single crystal semiconductor being pulled is adjusted to 0.126 m/sec or higher.

4. A method for manufacturing a single crystal semiconductor doped

with an impurity by immersing a seed crystal in a melt within a crucible and pulling the seed crystal while rotating the same, characterized in that:

a magnetic field is applied to the melt to satisfy the condition:

$$35.5 \leq M/V^{1/3} \leq 61.3$$

where M denotes a magnetic field strength at the bottom of the crucible, and V denotes a volume of the melt within the crucible.

5. A method for manufacturing a single crystal semiconductor doped with an impurity by immersing a seed crystal in a melt within a crucible and pulling the seed crystal while rotating the same, characterized in that:

in the course of pulling the single crystal semiconductor, a peripheral velocity at the outer periphery of the single crystal semiconductor being pulled is adjusted to 0.141 m/sec or higher, and a magnetic field is applied to the melt to satisfy the condition:

$$40.3 \leq M/V^{1/3} \leq 56.4$$

where M denotes a magnetic field strength at the bottom of the crucible, and V denotes a volume of the melt within the crucible.

6. A method for manufacturing a single crystal semiconductor doped with an impurity by immersing a seed crystal in a melt within a crucible and pulling the seed crystal while rotating the same, characterized in that:

in the course of pulling the single crystal semiconductor, a peripheral velocity at the outer periphery of the single crystal semiconductor being pulled is adjusted to 0.141 m/sec or higher.

7. A method for manufacturing a single crystal semiconductor doped with an impurity by immersing a seed crystal in a melt within a crucible and pulling the seed crystal while rotating the same, characterized in that:

a magnetic field is applied to the melt to satisfy the condition:

$$40.3 \leq M/V^{1/3} \leq 56.4$$

where M denotes a magnetic field strength at the bottom of the crucible, and V denotes a volume of the melt within the crucible.

8. The method for manufacturing a single crystal semiconductor according to Claims 1 to 7, characterized in that the impurity added to the single crystal semiconductor is boron B or gallium Ga, the impurity concentration being 8.0×10^{17} atoms/cc or higher.

9. The method for manufacturing a single crystal semiconductor according to Claims 1 to 7, characterized in that the impurity added to the single crystal semiconductor is phosphorus P or antimony Sb or arsenic As, the impurity concentration being 5.0×10^{17} atoms/cc or higher.